

Cal Poly Views
**Air Pollution and Textiles with
Bonita Farmer**

Cal Poly Pomona University Library

Air Pollution and Textiles Summary

Cal Poly Views was a weekly interview series broadcast on radio station KWOW-AM. Episodes were 15 minutes long and were hosted by Cal Poly Pomona Director of News and Publications, Ed Pierce, in conversation with Cal Poly Pomona faculty or administrators on general interest topics.

Bonita Farmer was an Associate Professor and Chair of the Foods and Nutrition Home Economics Department at Cal Poly Pomona.

Subject Headings

Air pollution

Textiles

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Table of Contents

	<u>Page</u>
Introduction	1
Effect of Smog	2
Testing	3
Preventing Damage	4
Conclusion	6

Cal Poly Views Air Pollution and Textiles with Bonita Farmer

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*Interview Conducted by Ed Pierce
Transcribed by Lorecel Gravino*

KWOW presents *Cal Poly Views*.

EP: Hello everyone, welcome to KWOW's presentation of *Cal Poly Views*. Fifteen minutes each week devoted to interviews concerning subjects of current general interest and featuring faculty or administrators from Cal Poly Pomona.

EP: This is your host Ed Pierce talking today with Bonita Farmer, Associate Professor and Chair of the Foods and Nutrition Home Economics Department at Cal Poly. Together we'll discuss the effects of air pollution on apparel and home furnishing fabrics. A subject that concerns and gets us all involved.

EP: Today's guest, Bonita Farmer is long an expert in this area, she has a book coming out early next year, titled *Textiles*, published by Gin Company or Gin Company which includes chapters on the effects of air pollution and it will be an upper level high school text in science and home economics. She's consulted with private industry on this problem and supervise students participating in a research project at the statewide Air Pollution Research Center and UC Riverside. Welcome, Bonita Farmer.

BF: Nice to be here, Ed.

EP: Thank you. Tell us first what textiles are damaged by air pollution and the thing that we commonly call smog.

BF: I think all textiles are damaged some to a greater degree and some are damaged more readily by smog but practically all the textiles that you come in contact with, have some aspects, some of which are damaged by smog.

EP: And what is the damage that occurs?

BF: Loss of strength, loss of durability. When it's a colored textile you may see a color loss, you may see a loss of what we call body or hand of a fabric, in that suddenly something that had a nice texture to it, looks limp and weak. And these are all visual but there are also things that we can test physically, to see that they have occurred in fabrics.

EP: If I ask you to name types of textiles, would this be a long list? I, as an average man, can think of cotton, wool, synthetic, combination of synthetics in real fabrics.

BF: There's a wide variety of textile fabrics. There are many generic groups and within the generic groups of textile fibers are all the brand names of fibers made by specific companies. We also have all the natural fibers and some that are relatively new to consumers and they don't know how to handle them. For example, ramie is a cellulosic fiber that's recently become very widely used in apparel and in-home furnishings. It's very much like linen, but it's a new term and consumers are constantly bombarded with all these new terms and they wonder what they mean.

EP: We titled this, "The effects of air pollution on apparel and home furnishing fabrics" everything we wear, draperies and curtains, furniture coverings, carpeting, I presume would be included in this, wouldn't it?

BF: Oh yes and I think consumers are particularly concerned about the smog damage on things like carpets and draperies because they are initially high cost items. They cost a lot to maintain and when you have to replace them, there is always an inflated price that you have to deal with so we're talking about the whole gamut of textile products when we talk about smog damage.

EP: You may have somewhat answered the next question that I had for you, which is are there any, that are not damaged in some way?

BF: No, I don't believe so, but some are more resistant. For example, we find that some of the synthetics can be manufactured in such a way that they are more resistant to smog damage. Some chemical inhibitors can be put in the solution before the fiber's spun so that it will be more resistant to smog damage.

EP: I suppose, then if you knew what caused the damage that manufacturers might put chemists and research people to work to find something that would inhibit or slow it down as you say.

BF: Yes, that's correct.

EP: What is it in the air that causes the type of damage we're talking about?

BF: Well, the two pollutants that we studied intensively were ozone and then oxides and nitrogen. And both of these pollutants have marked effect on color of fabrics and also on their strength.

EP: Do they mainly weaken the fabric first, as that's the first thing that you see go?

BF: In studies that we have done, usually the color of the fabric is the first thing that you can visually notice, but at the same time you can't see strength losses unless maybe you're a dry cleaner, and this homemaker brings their family drapes in and have some cleaning, when they

come back they're in shreds and the question is why did this happen? It's not the dry cleaner's fault, that the fact that this deterioration had been going on all along.

EP: How do you as a research person know what it is well—how do you determine your damage? What are the test procedures that you use? Or that are used?

BF: Oh, the best test procedure is to simulate true-to-life situation. This is what we were doing with the statewide Air Pollution Research Center in that we actually hung fabrics in test houses, expose them to various kinds of air pollution, as well as clean air and then with laboratory procedures we measured the amount of damage that had occurred.

EP: Comparing it with something that you kept retained in a controlled situation that would be exposed to the damage.

BF: We had houses that actually had clean air as well as those that had different kinds of pollutants going into them.

EP: Alright, if I had a home, whose windows were sealed and it was complete central air conditioning and we're talking now about home furnishing textures and textiles, would that benefit them?

BF: Yes, it would slow down the damage, but unless you filtered all the air that went in, there would still be some pollutants in the air and of course you're still going to have the sunlight getting to your textiles and this is probably the oldest known damage to textiles. So, you would need to protect them from the sunlight as well as closing off the access to the polluted air.

EP: People in rural areas, 100 years ago still had mother nature to contend with as far as heat, sun, moisture, cold and all which, all of which would have an effect on fabrics.

BF: Yes, of course. And the problem now is that the combination of the sunlight, the heat, with the chemicals in the air is what causes the more rapid deterioration. And probably you have heard stories of eastern cities where sulfur is so high in as an air pollutant where it actually dissolves women's nylon stockings as they walked down the street. While we don't have those kinds of conditions, but it's the synergistic effect, the combination of the heat and the chemicals that causes the fabrics to deteriorate.

EP: So, it is shortened fabric life.

BF: Yes, that's correct. Probably our parents thought of a carpet lasting 20 years and now maybe five, is time that you would probably consider at least re-carpeting a home.

EP: And this is regardless of type of carpeting that it is or whether it's synthetic, or partial synthetic, or deep pile, or shag, or whatever?

BF: Of course, the better the quality of the carpet, the slower the deterioration will be, but if even a high-quality carpet is exposed to sunlight over a long period of time it's going to deteriorate.

EP: What can be done to prevent, or minimize, or delay, this type of deterioration, or damage, if you can use that term.

BF: Well first of all, I think you have to think about this as a problem when you go to buy something. And as I said, the higher the quality, the lower or the slower the deterioration is. In other words, in a carpet the more fiber that's on the surface it's going to take longer for it to deteriorate. Looking for the synthetics which have the inhibitors in them sometimes they are labeled "FSR," sunlight resistant. Sometimes there will be a special notation on the carpet backing label. It will say that it has been tested for sunlight resistance and the various pollutants that it has been exposed to and tested. Part of the quality control programs in many of the manufacturers is to test them in various chambers where they're exposed to these pollutants and this will often be indicated on the carpet label. Once you get it in your home though, you need to protect the furnishings from the sunlight, also it helps to clean them regularly. I'm not going to say give you a time period every six months or anything like that, but to keep them clean.

EP: And you're mainly talking carpeting and drapes?

BF: Carpeting and drapes. [It] helps a lot because there's a cumulative effect of some of these pollutants and they accumulate on the surface of the fabric and deteriorate. Consumers probably have noticed this in swimsuits, since we're just thinking the end of a summer where they have exposed their swimsuit to chlorine over the summer. Maybe they don't rinse it out, by the end of the summer the fabric is deteriorated. Well this is the kind of a cumulative damage that I'm talking about. That the pollutants tend to deposit themselves on the surface of the fabric. If they're there for a while they go inside the fiber and then the deterioration is permanent. Or the damage is permanent.

EP: What if I had carpeting with a pad—I'm sure we all have seen this where the pad is deteriorated before the carpet did. Is this due in any way to air pollution or is it just a synthetic in the wear and tear in the weight?

BF: Probably the pad that deteriorated had rubber in it and many of them do have rubber. We're going a lot into synthetics now for this very reason, because rubber is so sensitive to air pollution damage. I think the synthetic pads probably have helped a great deal in slowing down this kind of deterioration, but yes this is air pollution, it could be also combination of moisture with other things too.

EP: Changing the thought to clothing, is there anything being done by manufacturers of washing machine, soaps, or softeners, or things like this that have anything that is in any way an inhibiting agent or preservative?

BF: I don't believe they've developed them with this intent in mind, but there are certain things that coat the fabrics, that would act as a barrier for the smog getting to the fabric, such as fabric softeners, these would act as a barrier. But many of the cleaning compounds are chemicals in themselves that deteriorate fabrics, for example chlorine bleach is probably the most widely used and known.

EP: Are there soaps which of by themselves, I mean just the washing process now, are harsher on fabrics than others?

BF: Oh yes, there are some soaps—

EP: And liquid soap is any different than granulated?

BF: I don't believe that the form in which it's presented makes a difference, but there are soaps which have, which are heavy duty, which are stronger and are meant to get out more dirt. But sometimes it's better to get the dirt out than to use a mild soap and not actually clean the fabric. We do a lot of this kind of testing in our Textiles Laboratory here at Cal Poly.

EP: Is there any difference in your testing—did you compare different parts of Southern California or the southern and northern parts of the state at, in talking about the statewide air pollution research?

BF: No, most of our research was confined here to Southern California but other researchers in other parts of the country have done similar kinds of studies. For example, there has been a lot of research done in North Carolina regarding air pollution and fabric deterioration.

EP: So, we don't hold franchise on air pollution.

BF: No, we don't, not even our cities hold the key to that. Cities all over the United States now have air pollution. It's not just a Southern California problem.

EP: And there's really, we have to live with that, right. There's not much we can do and we have to anticipate that with the pleasures of life today, come certain things and maybe it means a shorter life on draperies carpeting or clothing and not much else we can do, is there?

BF: Well, I would hope we would still try to clean up our air because that's really the secret. I mean a manufacturer can produce a better fiber and a better finish to protect the fabric, but our long-term goal would be to clean up the air, when we know this is occurring.

EP: How long can you measure, how far back we've had enough an effect of air pollution on fabrics?

BF: No, it was only in the late 60s that textile researchers became interested in the problem. But evidence of textile damage goes quite a bit farther back.

EP: Well, thank you Bonita Farmer and thank you ladies and gentlemen for listening to this week's edition of Cal Poly Views. Fifteen minutes devoted to discussing topics of current and general interest. If there are subjects which you would like to hear discussed by faculty or administrative experts from Cal Poly Pomona, please write to *Cal Poly Views*, Office of News and Publications, 3801 W. Temple Ave., Pomona 91768. We hope you'll join us again next week at the same time for another interesting interview when KWOW presents *Cal Poly Views*. This is your host, Ed Pierce speaking.

End of interview

Index

	<u>Page Number</u>
Air Pollution Research Center	1, 3
Chlorine	4-5
Nitrogen	2
Oxide	2
Ozone	2
Ramie	2
Smog	1-2
Soap	5
Sulfur	3
Textiles Laboratory	5
UC Riverside	1